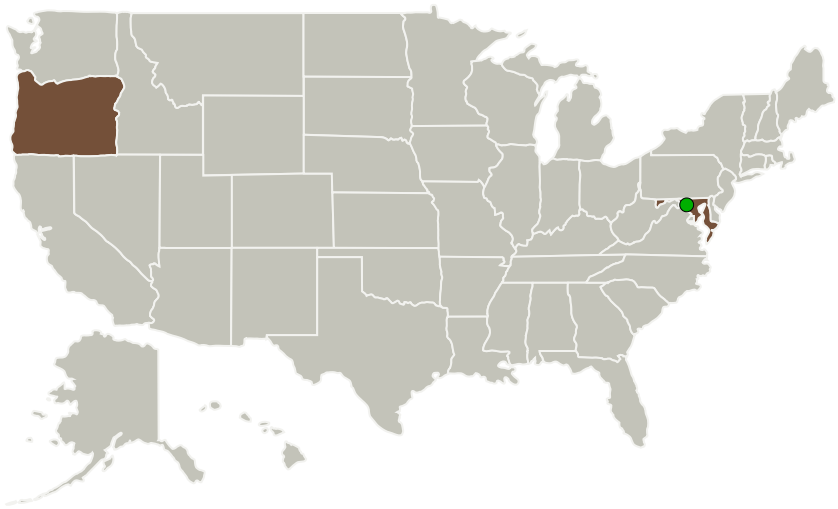
# Monolithic Gradient Index Phase Plate Array, Phase I

Completed Technology Project (2014 - 2014)

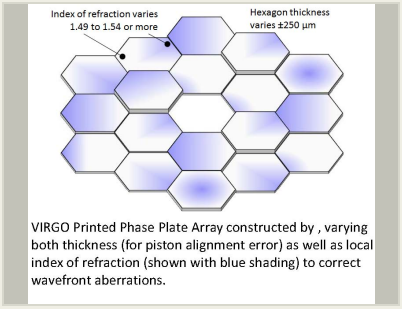
## Project Introduction

The "piston errors" and aberrations of the mirror segments used in large telescopes, are typically measured with on-board optical instruments, usually a dispersed Hartman sensor (DHS) and/or dispersed fringe sensor (DFS). Calibrating and testing of the wavefront sensors are typically performed using custom-built fused silica phase plate arrays. The manufacture and assembly of each custom phase plate array is time-intensive and expensive. Proposed is a gradient index (GI) phase plate array (PPA), which integrates the corrections of the DHS, an intermediate smoothing phase plate, and the DFS. This reduces the number of phase plates required, from three to one, and allows for the PPA t be used in the pupil plane, allowing for more precise calibration. The monolithic construction of the innovation significantly reduces development time and cost.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Voxtel, Inc. | Lead Organization | Industry | Beaverton, Oregon |
| Goddard Space Flight Center(GSFC) | Supporting Organization | NASA Center | Greenbelt, Maryland |




Monolithic Gradient Index Phase Plate Array Project Image

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| Primary U.S. Work Locations | |
|---|---|
| Maryland | Oregon |

## Project Transitions

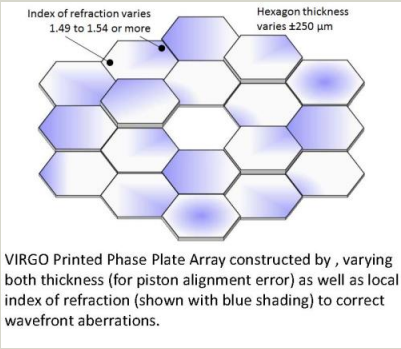
**June 2014:** Project Start

**December 2014:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/137591)*

## Images




VIRGO Printed Phase Plate Array constructed by , varying both thickness (for piston alignment error) as well as local index of refraction (shown with blue shading) to correct wavefront aberrations.

**Project Image**
Monolithic Gradient Index Phase Plate Array Project Image *(https://techport.nasa.gov/image/130218)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
Voxtel, Inc.

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

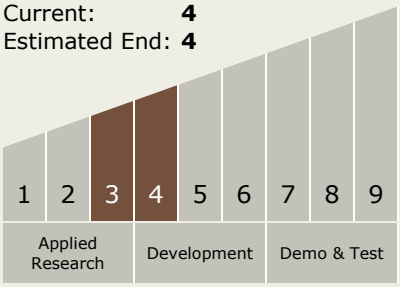
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Charles Dupuy

## Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.3 Electronics and Optics Manufacturing Process

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System